

Multi Phase Flow Decomposition and Imaging Using Electrical Capacitance Volume Tomography Sensors, Phase II

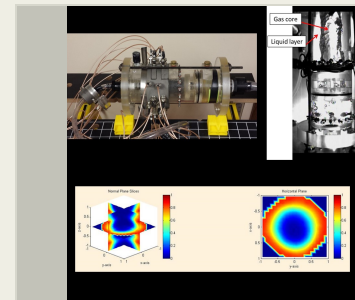
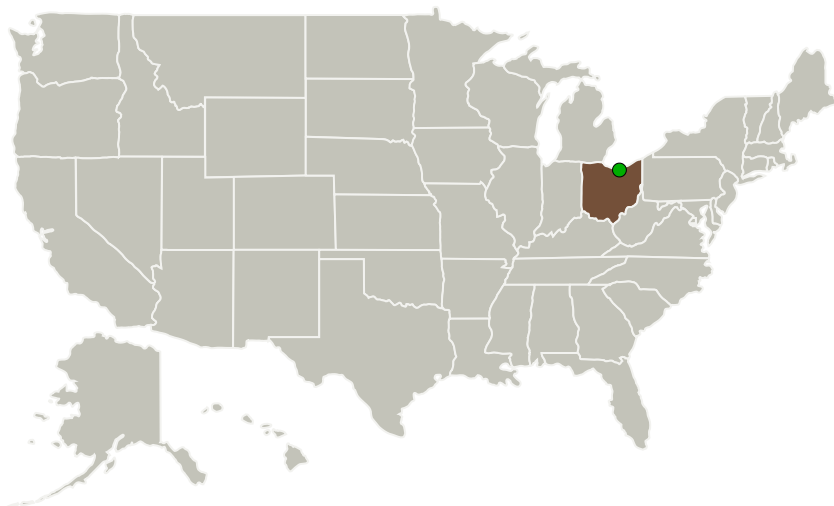
Completed Technology Project (2016 - 2018)



Project Introduction

In this proposed effort, we will develop a prototype product of a higher resolution ECVT system based on multi-phase decomposition for a two phase flow with water as the liquid phase, namely a phase separator. The intrinsic high measuring speed of capacitance measuring technology and potential high resolution capability of multi-phase decomposition will enable phase imaging at resolution better than the 2~3 mm specified by the topic description. Simulation and measurement results were used to verify this approach in Phase I. By the end of this Phase II, a prototype system that can image Air and Water phases in a phase separator with high accuracy, angular and vertical velocities of water layer, and water mass flow will be demonstrated. The developed prototype will serve as a deliverable to NASA by the end of this Phase II. It will be composed DAS unit, modular ECVT sensors, and reconstruction software. The proposed deliverable will be a working unit in form, fit, and function for phase separator experiments. It will also be suitable for utilization in the International Space Station after flight hardening. Flight hardening is not part of this effort.

Primary U.S. Work Locations and Key Partners



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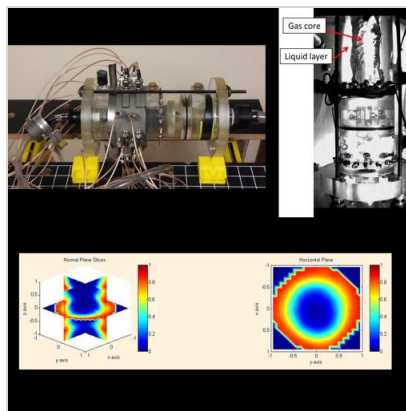


Organizations Performing Work	Role	Type	Location
Tech4Imaging, LLC	Lead Organization	Industry	Columbus, Ohio
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations

Ohio

Images



Briefing Chart Image

Multi Phase Flow Decomposition and Imaging Using Electrical Capacitance Volume Tomography Sensors, Phase II
(<https://techport.nasa.gov/image/131127>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Tech4Imaging, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

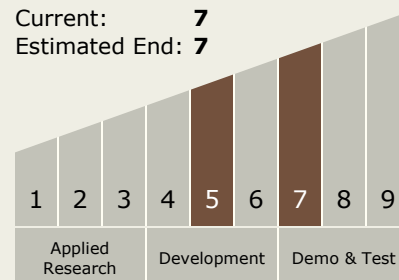
Carlos Torrez

Principal Investigator:

Qussai M Marashdeh

Technology Maturity (TRL)

Start: 5
Current: 7
Estimated End: 7



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
 - └ TX06.1.4 Habitation Systems

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System